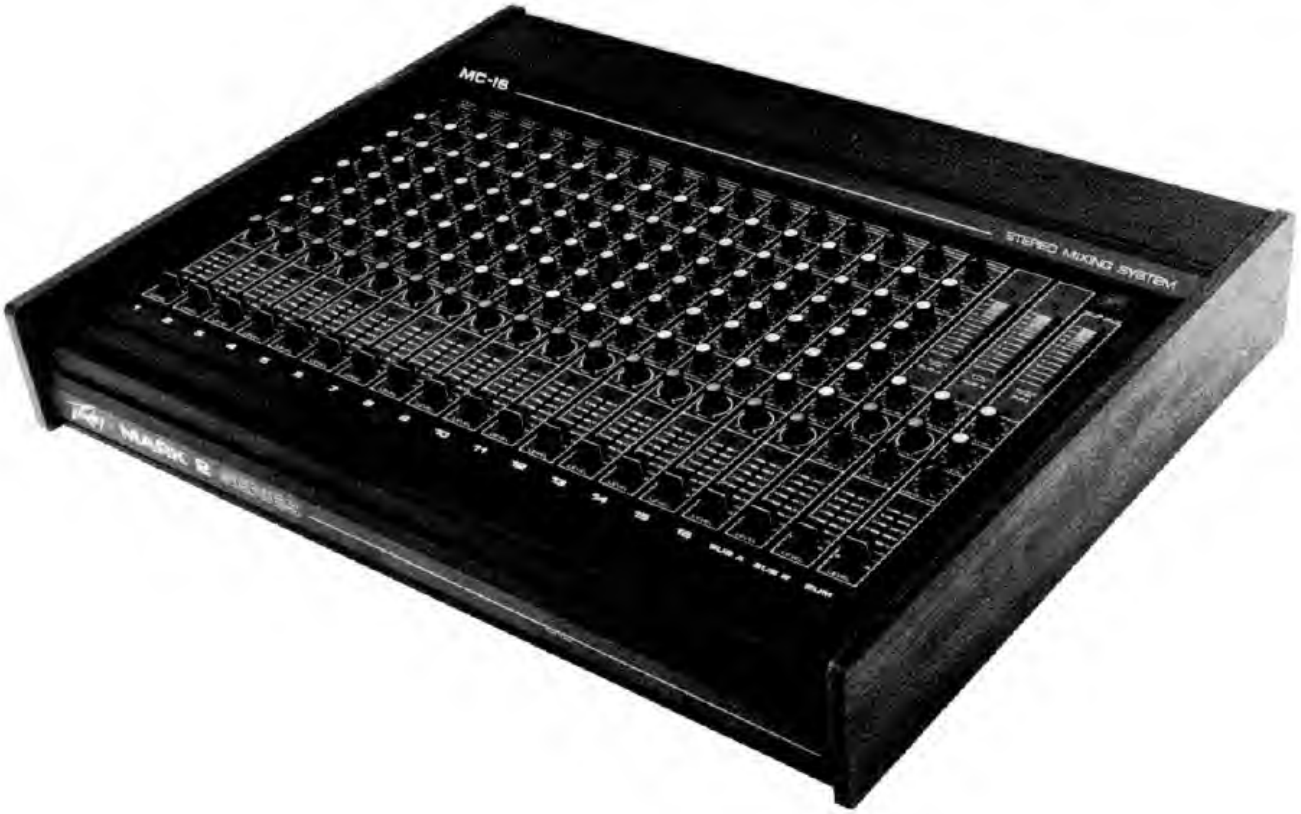
MARK 2 SERIES
OPERATING GUIDE

MR-7, MC-8, MC-12, MC-16, MC-24 MIXERS



PEAVEY ELECTRONICS CORP.
711 A Street / Meridian, Mississippi 39301

WARNING: **To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture.**

1.0 GENERAL DESCRIPTION

The Peavey Electronics Mark 2 Series mixing consoles are designed for portable or fixed installation sound reinforcement mixing applications. The Mark 2 Series mixing consoles are available in 8, 12, 16 and 24 input configurations. Also included in this series is a special rack-mount mixing console in a 7 input configuration. These units are designed for optimum operational flexibility when used for sound reinforcement purposes. The master controls include two sub mixes and a master mix which is the sum of the sub mixes. This feature allows the operator optimum flexibility of control in that rather than having a stereo output which must be recombined for monaural, this function is provided internally with all required level controls, metering and 600-Ohm transformer coupled output line amplifiers.

2.0 CONTROLS AND INDICATORS

2.1 INPUT CHANNELS

All Mark 2 Series input channels are functionally and electronically identical. A functional description of each control and indicator is given in the following subsections.

2.1.1 OVERLOAD

The preamplifier LED OVERLOAD indicator illuminates when there is approximately 20.0 dB of dynamic range remaining before the input circuitry clips. Normal operation is indicated when the OVERLOAD indicator flashes on high level transients. If the indicator illuminates and remains on, the preamplifier is severely overloaded.

2.1.2 ATTENUATION (ATTN.)

The input attenuation (ATTN.) control adjusts the input preamplifier gain and relative output level. The adjustment of this control is the dominant factor in the signal-to-noise ratio of the mixer. The attenuation control should be adjusted so that the overload indicator illuminates on program peaks only. The correct adjustment of this control will optimize operating levels through the input channel.

2.1.3 MONITOR

The MONITOR control adjusts the amount of signal fed to the monitor buss. The monitor signal is derived after the input attenuator control but before (pre) equalization. The use of external devices (which are plugged into the channel send and return jacks) will in no way effect the monitor signal. Under normal operating conditions, the monitor control will be adjusted between "3" and "7" as indicated by the front panel markings.

2.1.4 HIGH EQUALIZER

The HIGH equalizer control adjusts the amount of boost or cut of frequencies above 15.0 kHz. The equalizer action is the shelving type which provides a very smooth response in this band of frequencies.

2.1.5 MID 2 EQUALIZER

The MID 2 equalizer control adjusts the amount of boost or cut of program material in the frequency range centered at approximately 5.0 kHz. The equalizer action is of the peak and dip type.

2.1.6 MID 1 EQUALIZER

The Mid 1 equalizer control adjusts the amount of boost or cut of program material in the frequency range centered at approximately 500.0 Hz. The equalizer action is of the peak and dip type.

2.1.7 LOW EQUALIZER

The LOW equalizer control adjusts the amount of boost or cut of frequencies below 100.0 Hz. The equalizer action is the shelving type which provides a very smooth response in this frequency range.

2.1.8 EFFECTS

The EFFECTS level control adjusts the amount of signal fed to the effects buss. The EFFECTS control is located in the channel circuitry (post) all equalization and prior to the pan and level controls. The EFFECTS control can be used to provide an additional buss output if no special effects unit such as digital delay lines are used.

2.1.9 PAN

The PAN control is used to place the channel output in any desired location in a stereo image. For instance, a lead guitar can be "panned" or moved from the right side of the stereo image to the left side. In the center position, the guitar will appear to be in the center or orginating from both the left and right sides. It will be noted that the center position will be down in level 3.0 dB referenced to the level when the control is in the maximum left or right position. This control action is in strict accordance with existing recording studio standards.

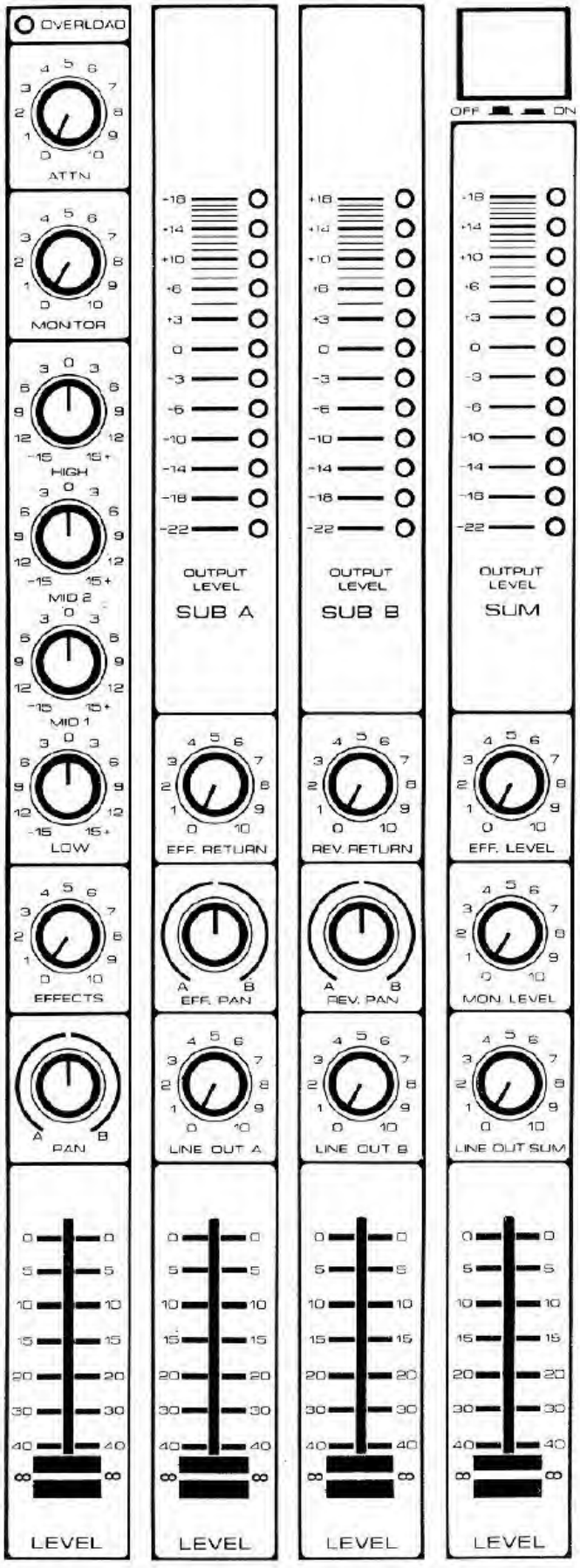
2.1.10 LEVEL

The LEVEL control adjusts the A and B channel outputs applied to the A and B mixing busses. For most normal applications, the LEVEL control will be adjusted to the center of its operating range. The MONITOR control is functional regardless of the LEVEL control setting.

2.2 SUB A CHANNEL CONTROLS AND INDICATORS

The SUB A channel contains the LED OUTPUT LEVEL A indicator, LINE OUT A control, EFF. RETURN control, EFF. PAN control, and the channel A LEVEL control. Each of the LINE OUT A controls and indicators operate as described in the following subsections.

FIG. 1


OVERLOAD
ATTN
MONITOR
HIGH
MID 2
MID 1
LOW
EFFECTS
PAN
OUTPUT LEVEL
SUB A
OUTPUT LEVEL
SUB B
OUTPUT LEVEL
SUM
OFF
ON
EFF. RETURN
REV. RETURN
EFF. LEVEL
EFF. PAN
REV. PAN
MON. LEVEL
LINE OUT A
LINE OUT B
LINE OUT SUM
LEVEL
LEVEL
LEVEL
LEVEL

2.2.1 SUB A OUTPUT LEVEL INDICATOR

The LED OUPUT LEVEL indicator accurately shows the console output level when terminated into an impedance of 600 Ohms. The LED arrays used in the Peavey mixing consoles are unique in respect that a full 40.0 dB dynamic range is accurately displayed. The LED array offers several advantages over standard VU meters. The first and most obvious advantage is that a full 40.0 dB range is covered as compared to 23.0 dB for a standard VU meter. The LED array is much more accurate because there are no moving parts so that even the fastest of transients are displayed. You can see a peak that goes to +8 that would not move the needle of a VU meter. LED displays are also very rugged; they can stand a shock or drop which would ruin the best of VU meters. In addition, because LED displays are completely solid-state, there are no lamps to burn out.

There are no established standards for what the display should indicate under normal conditions. Calibration procedures are given in the "operation" section of this manual.

2.2.2 EFF. RETURN

The EFFECTS (EFF.) RETURN control adjusts the signal level from the rear panel mounted effects return jack. This input can be used for an additional high level input, if required. The output from the EFFECTS RETURN control is applied to the EFFECTS (EFF.) PAN control.

2.2.3 EFF. PAN

The EFFECTS (EFF.) PAN places the signal from the EFFECTS RETURN control in the desired position of the stereo image. The control action of the EFFECTS PAN control is the same as previously described in paragraph 2.1.9.

2.2.4 LINE OUT A

The LINE OUT A control adjusts the A buss signal for the desired level at two points: The rear panel mounted headphone jack left channel and the rear panel mounted line output jack. The LEVEL A control will not affect the operation of the LINE OUT A control.

2.2.5 LEVEL

THE SUB A LEVEL control adjusts the console output level as indicated by the LED display associated with the A channel. Under normal applications, the level control will be in the "3" to "7" range.

2.3 SUB B CHANNEL

The SUB B channel contains the LED OUTPUT LEVEL indicator, the REV. RETURN control, THE REV. PAN control, and the LINE OUT B control. Each of the controls and indicators operate as described in the following subsections.

2.3.1 SUB B OUTPUT LEVEL INDICATOR

Refer to SUB A OUTPUT LEVEL INDICATOR, paragraph 2.2.1.

2.3.2 REV. RETURN

When not using an external effects device, the REVERB (REV.) RETURN control adjusts the amount of reverberation supplied by the internal electro-mechanical reverb unit. The input channel EFFECTS control must be properly adjusted in order for the REVERB (REV.) RETURN control to be functional.

2.3.3 REV. PAN

The REVERB (REV.) PAN control places the delayed signal in the desired position of the stereo image. The pan control action is the same as previously described in paragraph 2.1.9.

2.3.4 LINE OUT B

The LINE OUT B control adjusts the B buss signal for the desired level at two points: The rear panel mounted headphone jack right channel and the rear panel mounted line output jack. The B LEVEL control will not affect the operation of the LINE OUT B control.

2.3.5 LEVEL

The SUB B LEVEL control adjusts the console output level as indicated by the LED display associated with the B channel. Under normal application, the level control will be in the "3" to "7" range.

2.4 SUM CHANNEL CONTROLS AND INDICATORS

The sum channel contains the LED OUTPUT LEVEL indicator, EFF. LEVEL control, MON. LEVEL control, LINE OUT SUM control, and the sum channel LEVEL control. Each of the controls and indicators operate as described in the following subsections.

2.4.1 SUM OUTPUT LEVEL INDICATOR

Refer to OUTPUT LEVEL indicator SUB A, paragraph 2.2.1.

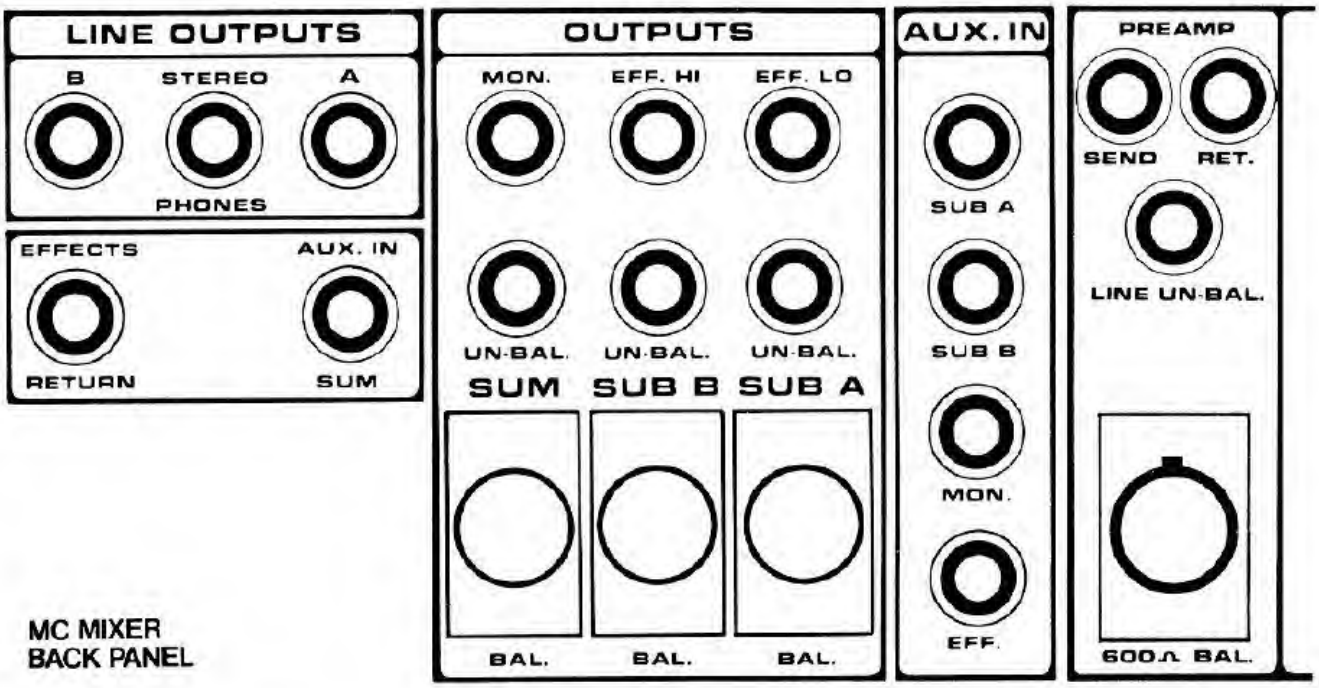
2.4.2 OFF/ON POWER SWITCH

The Off/On power switch and internal lamp is provided for application and removal of primary (mains) power and as an indication of power being applied.

2.4.3 EFF. LEVEL

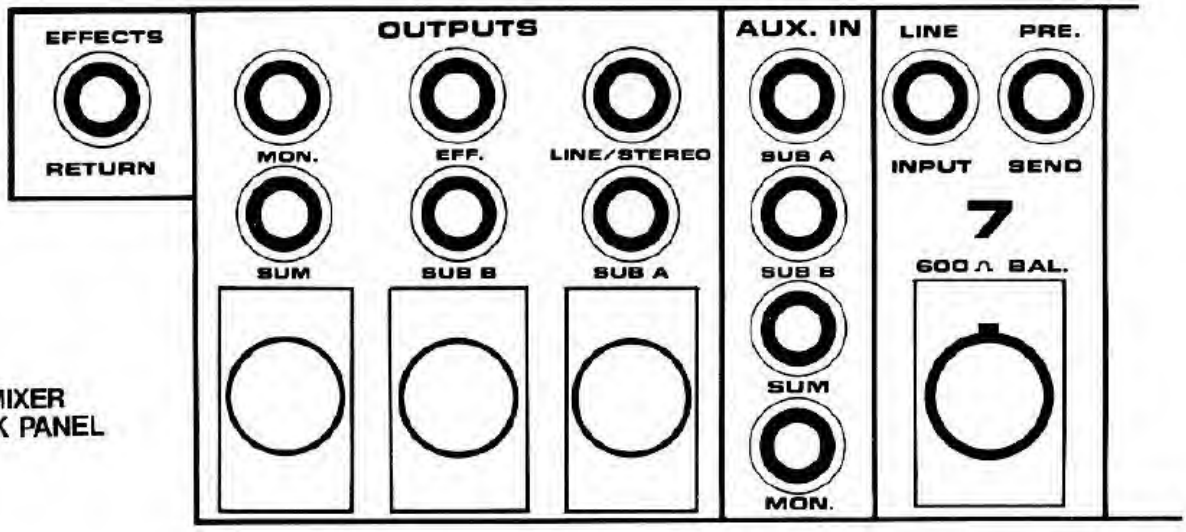
The EFFECTS (EFF.) LEVEL control adjusts the effects signal level appearing on the rear panel mounted effects high and effects low output jacks. The EFFECTS control on the input channel in use must be adjusted upward in order for the EFFECTS LEVEL control to function.

FIG. 2



MC MIXER
BACK PANEL

FIG. 3



MR MIXER
BACK PANEL

2.4.4 MON. LEVEL

The MONITOR (MON.) LEVEL control adjusts the signal level appearing on the rear panel mounted monitor output jack. Operation of the MONITOR LEVEL control is dependent on one or more of the MONITOR LEVEL controls located on the respective input channels being advanced to their normal operating position. The MONITOR LEVEL control and monitor output signal is not affected by any adjustment of the equalization or effects controls.

2.4.5 LINE OUT SUM

The LINE OUT SUM control is the master level control for a monaural mix of both the A and B buss line outputs. The A or B LINE OUTPUT controls must be advanced to their normal operating points before the LINE OUT SUM control becomes functional. Either one or a combination of these controls must be advanced before any output will be present at the rear panel mounted sum output jack.

2.4.6 SUM LEVEL

The SUM LEVEL control adjusts the console output level as indicated by the SUM OUTPUT LEVEL LED array. The console output is a monaural mix of the A and B outputs. Either one or both of the A and B SUB LEVEL controls must be advanced before the SUM LEVEL control becomes functional.

3.0 EXTERNAL CONNECTIONS

The Mark 2 Series mixing consoles are designed to be both impedance and level compatible with most professional equipment. In accordance with accepted engineering practice, all outputs are low impedance (600 Ohms or less) and all inputs, with the exception of the Low Z microphone input, are of the high impedance (greater than 10 K Ohms) configuration.

In most modern electronic equipment, no requirement exists to actually match impedances. An example of this is that if you have a 600-Ohm microphone input impedance, you can use a 150, 200, or 600-Ohm microphone without signal degradation. As a general rule, you can go from a low impedance source to a high impedance load without difficulty; however, you cannot go the other way around. If, for example, you connect a high impedance microphone to the Low Z console input, you will find that there is very little or no microphone output. This is because the console loads the microphone to the point where there will be very little output.

3.1 WIRING

You have purchased one of the finest mixing consoles currently available. You can ruin its performance by use of incorrect wire and connectors. When connecting your console to external equipment, all wiring, except AC power leads, must be shielded and of good quality. Wherever you have a balanced input or output, it is desirable to use a completely balanced system. Be careful to watch the phase relationships when wiring your connectors. Standard industry practice in the United States is that pin 1 is shield, pin 2 is common or black, and pin 3 is hot or white. In Europe, the phase relationship between pins 2 and 3 is reversed. A single mis-wired microphone has been known to cause everything from feedback to complete phase cancellation of a desired signal.

The use of good quality cable and balanced systems will greatly reduce the possibility of R.F. (radio frequency) pickup such as C.B. sets and taxi cab radios.

The use of balanced low impedance cables will also help reduce the noise associated with lighting dimmer systems. It is a good idea to try and keep your signal cables away from the light man's power cables. If possible, run your cables on the other side of the room.

Whenever short high impedance cables are used as patch cords, try to keep these cables as short as possible. Do not under any circumstances use coiled or "stretch" type cables for interconnecting your equipment. These cables are excellent antennas for all types of noise. They also tend to be quite microphonic in that when moved they act as a capacitor microphone.

3.1.1 AC POWER DISTRIBUTION

Of all problems which plague sound reinforcement systems, AC power is often one of the most obvious and most difficult to correct. If at all possible, have everything connected to a single distribution point even if this means several hundred feet of cable. Every preamplifier, power amplifier, console and monitor system components must be connected at the same point. This does not mean a set of wall outlets on one breaker; this means a single AC distribution point or outlet. Following this rule is the only way you can almost guarantee that hum and light dimmer noise will be at minimum. All stage equipment, if possible, should be connected to this point. The only precaution is to make sure the circuit will handle the required current load. If it is necessary to operate the stage equipment from a separate source, make absolutely sure that none of the guitar amps or any other instrument is connected directly to the P.A. system ground. If direct feeds are used, remove the shield connection from the instrument end of the balanced high level direct box cable.

CAUTION

PRIOR TO EVERY PERFORMANCE, CHECK THE GROUND LOOPS BETWEEN THE P.A. SYSTEM AND INSTRUMENT AMPLIFIERS. DO NOT REMOVE THE THIRD PIN FROM THE AC LINE PLUGS. USE A SUITABLE ADAPTOR, IF REQUIRED.

Ground loops in the AC system can be irritating and dangerous. A lead guitar player and vocalist has a tendency to get upset when his bottom lip completes a 100-Volt ground loop. Use a Volt-Ohm meter (V.O.M.) adjusted to the AC Volts range and check for voltage between each mircophone and electric guitar. If a voltage is measured, use a switchable ground lift adaptor on the instrument amplifier power end. The correct procedure is to ground the green wire from the adaptor to the AC socket and change the plug position until no voltage is measured.

3.1.2 GROUNDING

In fixed installations such as schools, churches, and similar applications, the sound reinforcement system should be permanently grounded. Proper grounding will greatly reduce the possiblity of many types of noise in the system.

To properly ground a system, pick a good earth ground such as a cold water pipe (be sure it's not plastic) and run an A.W.G. number 12 wire to each piece of equipment used in the system. Do not connect all units together with one wire! Use a separate cable from the ground point to each unit, console, equalizer, main power amplifier and monitor amplifiers. This may seem like a lot of trouble but in a fixed installation, it is well worth the extra time and expense.

4.0 OPERATION

The Peavey Mark 2 Series mixing consoles are designed for maximum flexibility and ease of operation. Because this is a state-of-the-art mixing console, all possible operating modes could not be covered in this manual. It is strongly suggested that a thorough understanding of Section 2 "Controls and Indicators" be obtained prior to operation of the console.

One of the most common complaints in any mixing system is noise. Any low level amplification system will have some residual noise because of the inherent characteristics of electronic components. You can make any mixer seem noisy if you try hard enough, and many people accidently set up a mixer incorrectly and are upset with the noise level.

In order to correctly adjust the various stage gains, input attenuator (ATTN.), channel output (LEVEL), sub master gain (SUB LEVEL), and master output level (SUM LEVEL), all of these controls must be operated as a team. If all controls are set correctly, you will have a minimum noise, maximum dynamic range system. The following procedure is given as an operational guide only! There will be times where the operator's good judgment will supercede any type of procedure.

4.1 INITIAL SETUP

Before application of power, it is necessary to "clear" the board. This procedure is simple and takes very little time but it could save a great deal of time and frustration.

A. Adjust the channel input ATTN. control to "3".

B. Set all equalization (HIGH, MID 2, MID 1, and LOW) to "0" or the flat response position.

C. The channel MONITOR and EFFECTS controls should be fully counter-clockwise or to the off position.

D. Adjust the channel PAN control to the "12 o'clock" or center position.

E. Adjust all sub master controls, except the REV. PAN and EFF. PAN controls, to fully counter-clockwise or minimum position. Adjust the PAN controls to the "12 o'clock" or center position.

F. Adjust the sub master LEVEL controls to the ∞ or minimum output position.

G. Adjust all the SUM controls fully counter-clockwise or to their minimum positions. Adjust the SUM LEVEL to ∞ or minimum.

H. Apply power to the mixer.

4.2 LEVEL ADJUSTMENT

A. Connect the mixer to a signal source such as a microphone or tape deck. If you are using the mixer for the first time at a performance or in a recording session, start on one channel and proceed slowly to the additional inputs.

B. Using a microphone or tape deck (tape deck is preferable), adjust the channel ATTN. control until the channel OVERLOAD LED illuminates on program peaks.

NOTE

THE LED OVERLOAD INDICATOR WILL ACCURATELY DETECT PROGRAM TRANSIENTS THAT WOULD NOT MOVE THE NEEDLE ON A STANDARD VU METER EVEN THOUGH THE SIGNAL AMPLITUDE IS THE SAME. PROPER OPERATION IS OBTAINED WHEN THE INDICATOR ILLUMINATES ON PROGRAM PEAKS ONLY. THERE IS APPROXIMATELY 20.0 DB OF HEADROOM REMAINING AFTER THE LED COMES ON. IF THE LED COMES ON AND REMAINS ILLUMINATED, THE INPUT PREAMPLIFIER IS SEVERELY OVERLOADED.

C. Adjust the channel LEVEL control to "20".

D. Adjust the SUB level control until the OUTPUT LEVEL LED array indicates approximately -3.0.

E. Plug the power amplifier into the SUB A output jack and adjust the power amplifier gain control as required for a comfortable listening level.

F. Using the channel EQUALIZATION controls, equalize the signal for the desired tonal characteristic. Excessive equalization (greater than +12.0 dB) often indicates incorrect phasing or speaker syustem crossover adjustment. Remove the power aplifier input from the SUB A output and reconnect the power amplifier to the SUM console output.

G. With one channel in operation, you can calibrate the power amplifier used with the mixing console. In most applications, the SUM or grand master LEVEL control will be used for the mixer output. When the SUB mix output LEVEL LED display is indicating around -3, adjust the SUM LEVEL control until the SUM OUTPUT LEVEL LED display indicates -3.0. If the power amplifier in use has a standard VU meter, adjust the power amplifier gain control until the meter deflects to "0" VU. The reason for the 3 dB difference is to allow for the inherent slowness of VU meters to react to fast program peaks. If the power amplifier has a peak reading VU meter, calibrate the power amplifier meter with the console LED display. Power amplifiers using a peak overload indicator illuminates at the same time as the SUM OUTPUT LEVEL indicator +3.0 dB LED illuminates.

NOTE

ON MOST SOLID-STATE POWER AMPLIFIERS WHEN THE PEAK OVERLOAD INDICATOR ILLUMINATES, IT MEANS THAT THE POWER AMPLIFIER IS DELIVERING MAXIMUM POWER TO THE LOAD. IT IS NORMAL FOR THE POWER AMPLIFIER OVERLOAD LED TO ILLUMINATE ON PROGRAM PEAKS. IF THIS INDICATOR REMAINS ILLUMINATED FOR A VERY LONG PERIOD OF TIME (2 or 3 SECONDS), THE POWER AMPLIFIER IS CLIPPING AND IT IS JUST A MATTER OF TIME BEFORE THE SPEAKER SYSTEM IS DESTROYED.

H. Once the power amplifier associated with the Mark 2 Series mixing console is calibrated, mark the power amplifier control location. Unless accessories such as limiters or graphic equalizers are added to the system, the calibration should not have to be repeated.

CAUTION

THE PEAVEY MARK 2 SERIES MIXING CONSOLES WILL DELIVER +18.0 DBM OR GREATER INTO A LOAD OF 600 OHMS. THIS SIGNAL IS SUFFICIENT TO DRIVE ANY POWER AMPLIFIER INTO COMPLETE CLIPPING. SPEAKER SYSTEMS ARE VERY QUICKLY DAMAGED BY SUCH ABUSE. PEAVEY ELECTRONICS CORPORATION, THEREFORE, ASSUMES NO RESPONSIBILITY FOR SPEAKER SYSTEM DAMAGE IF THE MARK 2 SERIES CONSOLE IS INCORRECTLY ADJUSTED.

Mark 2 Series Mixing Consoles Specs

Printed in U.S.A.

Inputs:
1 Low Z, 1 High Z microphone input each channel; access to all busses: Main A, Main B, Monitor, Effects and Sum.

Mic Input:
Mic Impedance: Low Z: 200.0 Ohms
Nominal Input Level: -40.0 dB (10.0 mV)
Minimum Input Level: -80.0 dB (0.10 mV)
Maximum Input Level: -10.0 dB (0.30 Volts)

Line and Hi Z Mic Input:
Line Impedance: Greater than 20.0 K Ohms
Nominal Input Level: -20.0 dB (0.10 Volts)
Minimum Input Level: -60.0 dB (1.0 mV)
Maximum Input Level: +10.0 dB (3.0 Volts)

Main Outputs (A and B):
Load Impedance: 600.0 Ohms, balanced and unbalanced.
Nominal Output Level: +4.0 dB (1.2 Volts)
Maximum Output Level: +20.0 dB (8.0 Volts)

Sum Output:
Load Impedance: 600.0 Ohms, balanced and unbalanced.
Nominal Output Level: +4.0 dB (1.2 Volts)
Maximum Output Level: +20.0 dB (8.0 Volts)

Monitor and Effects Output:
Load Impedance: 600.0 Ohms, unbalanced
Nominal Output Level: +4.0 dB (1.2 Volts)
Maximum Output Level: +20.0 dB (8.0 Volts)

Headphones:
Load Impedance: 4.0 Ohms — 50.0 Ohms
Maximum Output Level: 0.50 Watt

Frequency Response:
30.0 Hz — 20.0 kHz, ±2.0 dB

Equivalent Input Noise:
0.60 micro-Volts or -125 dBV, 200.0 Ohm source impedance.

Equalization:
High Mid and Low Mid: Peak and dip type, ±15.0 dB continuously variable
High and Low Frequency: Shelving type, ±15.0 dB continuously variable
Frequencies:
Low: 100 Hz
Low Mid: 500 Hz
High Mid: 5.0 kHz
High: 15.0 kHz

Crosstalk:
Greater than 60.0 dB (at 1.0 kHz)

Overall Distortion:
Less than 0.3% THD (Mic input to output)

Fader Attenuation:
Greater than 60.0 dB

Send Data:
Preamp direct send level: Nominal Output — 5.0 Volts into 1.0 K Ohms or higher

Buss Input, Sub-mix Input:
Input Impedance: Greater than 22.0 K Ohms
Nominal Level: -4.0 dB (0.50 Volts)

Power Requirements:
117 VAC, 60 Hz, 30 Watts